MEMORANDUM

DATE: January 4, 2001 **GMP #111**

TO: District Environmental Health Managers
District Health Directors
OEHS Staff

FROM: Donald J. Alexander, Director
Division of Onsite Sewage and Water Services

SUBJECT: Experimental Protocol for AlasCan/Clear Water™
Onsite – Experimental – AlasCan/Clear Water™

The Department has approved an experimental application from AlasCan/Clear Water™ Wastewater and Water Treatment Systems following a review by the Division in accordance with § 441 of the *Regulations*. The Department's approval of this protocol is only for the AlasCan/Clear Water™ System A and B and is not transferable to any other product. Applications for products other than AlasCan/Clear Water™ are subject to the provisions of § 441.

The AlasCan/Clear Water™ experimental protocol was submitted in accordance with § 260 and § 441 of the *Regulations*. All testing associated with the protocol will be conducted under the auspices of a professional engineer licensed in the Commonwealth of Virginia. Therefore, formal plans are not required for each system design but the application submittal must include adequate plans and specifications to assure proper installation. System design, installation, and operation shall comply with the requirements described in the **Experimental Protocol**, AlasCan/Clear Water™ System design, construction and installation literature, the *Regulations*, and standard engineering practice.

This GMP is intended to provide guidance on how to process applications for AlasCan/Clear Water Systems. The AlasCan protocol includes two separate systems identified as System A and System B.

January 4, 2001

Mr. Clint Elston, President
Alascan of Minnesota, Inc.
Post Office Box 88
Clear Lake, MN 55319

Re: Request for Experimental Approval
AlasCan/Clear Water™ Systems A and B

Dear Mr. Elston:

The Division of Onsite Sewage and Water Services (DOSWS) has completed its review of the information you provided for the AlasCan/Clear Water™ System A and B for compliance with § 441of the *Sewage Handling and Disposal Regulations* ("*Regulations*"). Our technical review included an evaluation of only the data and information you submitted for experimental approval.

Based on the information provided, the Division believes that you have complied with the requirements required for experimental approval. The experimental protocol and the Department's policy for permitting the products are enclosed. The AlasCan/Clear Water™ System experimental approval may be rescinded in accordance with the *Regulations* should the product fail to perform satisfactorily under field use conditions. Please understand that this approval is only for the AlasCan/Clear Water™ System A and System B. The approval cannot be transferred to any other product. If you wish to change any component or process with System A or System B, then you must first seek approval from DOSWS before installing that system under this experimental protocol.

This letter does not constitute an endorsement of the AlasCan/Clear Water™ System. If you have any questions or comments on the above please contact me at 804-225-4030.

Sincerely,

Donald J. Alexander
Director, DOSWS

Enclosure2

System A includes a composting toilet for black water treatment and a biological system and filtration for treating the greywater. The greywater is disposed into a sewage system acceptable under the *Regulations* or policy.

System B includes the same components as found in System A but provides for additional treatment for the greywater through disinfection and reverse osmosis. Thus, the treated greywater may be reused within the household for all purposes except for drinking and food preparation. No discharge is anticipated for this system.

The back-up system may include any generally approved system contained in the *Regulations* or policy. The backup for the AlasCan/Clear Water™ System composting toilet is another composting toilet that meets the requirement of the *Regulations*.

The following process outlines the procedures necessary to obtain a construction permit for an AlasCan/Clear Water™ System:

1. Owner or agent files an application including the associated fee as would be required for any application to construct a sewage system. The application may be for reviewing a new site, modifying a previously issued permit, or converting a certification letter to a construction permit for residential dwellings with flows less than 1,000 GPD. Local health departments, at their discretion, may require formal or informal plans and specifications depending on the complexity of the application.

2. If the application is for System A, then the local health department will perform a review of the proposal in accordance with VDH policy and regulation to assure that the site and soil conditions for treatment and disposal of the greywater meet the requirements specified in the *Regulations*. This review may include a site and soil evaluation for disposal of the greywater effluent if not provided with the application or by a non-AOSE. The local health department may perform a Level 1 review if the soil and site evaluation is certified by an AOSE as specified by the *Emergency AOSE Regulations*. Upon finding that the site and soil conditions comply with the *Regulations*, including an adequate back-up system, then the local health department can issue a construction permit. For the purposes of this experiment, the effluent quality can be considered secondary effluent as defined within the *Regulations*.

3. If the application is for System B, then the local health department must assure that an appropriate back-up system exists and that the proposal meets the plans and specifications in the experimental protocol and the AlasCan/Clear Water™ System literature.

4. When the system is installed, the professional engineer or someone working under his supervision will inspect the AlasCan/Clear Water™ System. After installation, both

the engineer and contractor must submit a completion statement signifying that the system was installed in accordance with the design plans and specifications, including the sewage system (System A) before an Operations Permit for an Experimental System is issued. The local health department, when necessary, will inspect the sewage system for System A.

5. After an Operations Permit is issued by the local health department, a copy of the permit and operations permit shall be sent to the Division of Onsite Sewage and Water Services for tracking purposes. The Operations Permit will be valid for 36 months from the date of issuance and may be renewed if necessary to complete the experimental process

Attachment: Experimental Protocol

GMP #111

Onsite-Product Approval-AlasCan/Clear Water™ System

Conditions of Approval

AlasCan/ClearWater™ Experimental Protocol

January 4, 2001

I. System Description

This experimental protocol is based on the specific components listed. Equivalent components may be used after receiving written approval from the Division of Onsite Sewage and Water Services. Unless otherwise stated, the components of the AlasCan/ClearWater™ System shall comply with the intent, objectives and requirements of the *Sewage Handling and Disposal Regulations*. The AlasCan/ClearWater™ Wastewater and Water Treatment System consists of the following listed key components:

Building Sewer. The building sewer used in conjunction with an AlasCan/ClearWater™ System shall comply with Part V of the *Sewage Handling and Disposal Regulations,* Uniform Statewide Building Code and the AlasCan and SeaLand Installation and Operation Manuals (Appendix A).

Pretreatment System. The minimum pretreatment system preceding the AlasCan/ClearWater™ absorption area shall be the AlasCan/ClearWater™ System consisting of an AlasCan Separation/Composting Tank, an AlasCan Greywater Treatment System and either Model A or B ClearWater Filtration and Disinfection System. These systems shall be designed and installed in compliance with the *Sewage Handling and Disposal Regulations*, the Uniform Statewide Building Code (USBC) and the AlasCan Separation/Composting Tank, AlasCan Greywater Treatment System and ClearWater Filtration and Disinfection System Installation and Operation Manuals.

The AlasCan/ClearWater™ System consists of the AlasCan Separation/Composting Tank and the AlasCan Greywater Treatment System, model A or B, plus additional filtration, and disinfection components "ClearWater System." ClearWater Model A treats effluent from the AlasCan Greywater Treatment System to a water quality suitable for subsurface disposal to an absorption area sized according to the design flow. ClearWater Model B treats effluent from the AlasCan Greywater Treatment System to a water quality for reuse within the household. This Experimental Protocol is for both ClearWater Models A and B. The design flow of treated greywater for System A is 50 gpd per person or 100 gpd per bedroom. Model A can disperse effluent to any absorption system approved by regulation or policy for treated greywater. Until further testing indicates a higher degree

of treatment the AlasCan Greywater Treatment System will be considered as meeting secondary standards allowing shallow placed designs or any other dispersal method approved for secondary effluent personate to the regulations.

The AlasCan/ClearWater™ System must disperse effluent to site and soil conditions meeting the *Sewage Handling and Disposal Regulations* or approved policies and the AlasCan/ClearWater System's Installation and Operation Manuals.

A. AlasCan Toilet & Organic Kitchen Waste Separation/Composting System (also referred to as the AlasCan Separation/Composting Tank or System)

This system utilizes the principles of aerobic decomposition. The System biologically converts ninety (90) to ninety-five (95) percent of all toilet and kitchen garbage disposal organic wastes into odorless carbon dioxide and water vapor. Aerobic organisms, thriving in the fan-driven, air assisted and insulated tank, convert the remaining portion into a soil amendment.

The manufacturer claims the aerobic/composting environment kills ninety (90) to ninety-nine (99) percent of viruses and pathogens through time and temperature. Programmable timer-driven agitators distribute the fresh wastes on the top surface of the tank to aid the organisms in the natural decomposition process. Approximately twelve (12) gallons (1.6 cubic feet) of finished compost is produced by a family of four per year and is removed by maintenance personnel with the auger system designed for this purpose. Even though this material is thoroughly composted it will still contain fecal coliform organisms because of the liquids from the toilet and toilet wastes that migrate downward through the composting mass to the excess liquid area. Compost that is removed must be either;

1. Removed from the site by an approved sewage/septage hauling company and disposed of at an approved sewage treatment facility or landfill.
2. Removed from the AlasCan Separation/Composting Tank, exposed to a microwave system until converted to a completely sterile, dry ash like material and disposed onsite. It is not to be used as a fertilizer for gardens or any type of plant that would be consumed.
3. Removed from the AlasCan Separation/Composting Tank and store in a separate sealed vessel in a warm location for sixty (60) days in order to meet Class A Biosolids standards.

Unless the solids from the System are taken to a sewage treatment facility or landfill the sludge shall be sampled for fecal coliforms and shown to comply with Class A biosolids. See section VII.

B. AlasCan Greywater Treatment System

Greywater is plumbed to a series of three (3) separate wastewater treatment and filtration tanks. This System consists of a Surge Tank for flow control, an Aeration Tank to

produce aerobic conditions for biological treatment and a Clarification Tank to return the settled solids back to the Surge Tank.

An air compressor provides air, which circulates and aerates the wastewater. Extended aeration is a standard wastewater technology utilized to provide the conditions for maximizing treatment in the home setting. As the water is circulated throughout the three tanks by the air compressor, airlift arrangements and gravity, the bacteria clean the water in a natural process.

Because toilet waste is separated from the greywater, total flow is reduced. The estimate for water consumption and greywater treatment is fifty (50) gallons of wastewater per person per day. The capacity of each AlasCan Greywater Treatment System is three hundred (300) gallons per day. For flows over 300 gpd, additional AlasCan Greywater Systems must be installed in parallel.

C. ClearWater Filtration, Disinfection and Potable Water Recycling System
(also referred to as the ClearWater System)

The AlasCan/ClearWater™ Model A and B Systems provide a filtration and disinfection capability for treating the effluent from the AlasCan Greywater Treatment System for subsurface absorption or for household use in a total recycle mode.

The Model A ClearWater System (System A) filters and disinfects the effluent from the AlasCan Greywater Treatment System. The Model B ClearWater System (System B) contains the same filtration and disinfection equipment as the Model A ClearWater System but additionally filters sediment, cysts, and removes odor by an appropriately sized reverse osmosis membrane filtration system. The rejected water from the reverse osmosis system is plumbed to flush the toilet or back into the AlasCan Greywater Treatment System for further treatment. Periodically, water is pumped from the AlasCan Greywater Treatment System into the AlasCan Separation/Composting System by the sludge removal pumping system and new water added to the AlasCan Greywater Treatment System to help control the levels of Total Dissolved Solids and salts.

Water purified by the reverse osmosis system is continuously disinfected utilizing a small circulation pump and an ultraviolet and ozone disinfection system. The Model B ClearWater System is capable of any flow rate by incorporating larger-sized FDA approved water storage tanks for the filtered and disinfected water. The entire AlasCan/ClearWater System will be monitored and controlled to automatically shut the systems off and alert the homeowner and/or maintenance personnel if any problem is detected. Drinking water and makeup water are provided by an approved well, municipal or other water supply.

D. SeaLand Toilets

SeaLand, an Ohio based company, manufactures a line of toilet fixtures that are designed for recreational vehicles and the luxury marine vessel marketplace. The toilets utilize a foot pedal operated flushing mechanism that rotates a ball/trap device. The toilet pedal can also be lifted with the foot, allowing more water to fill the toilet. The SeaLand Model 510 utilizes gravity and a steeper plumbing angle (25 degrees from horizontal or 2 1/2 inches per foot drop) to transport the toilet waste and paper to the AlasCan Separation/Composting System. The marine toilet, Model 508, incorporates the same toilet fixture but utilizes a small vacuum tank and a twelve (12) volt bellows type of pump to create a vacuum, which is capable of lifting the toilet refuse and transporting it to the AlasCan Separation/Composting Tank. This allows flexibility in locating the Tank instead of having to design the house or facility around the System.

E. Kitchen Garbage Disposals

Two thirds of all of the organic refuse that is produced in the household typically comes from the kitchen. The garbage disposal adds significant additional load requiring additional maintenance and pumping costs for standard septic treatment systems. With the AlasCan Separation/Composting System, a separate bar type of sink with a garbage disposal is installed next to the standard kitchen sink. With a small amount of water from a sprayer, this new kitchen fixture grinds up and transports all of the organic refuse to the AlasCan Separation/Composting System.

F. Monitoring, Maintenance and Guarantee Program

All operation and maintenance requirements are the sole responsibility of AlasCan of Minnesota, Inc. AlasCan/ClearWater™ Systems will be continuously monitored utilizing a small computer unit with a modem that is connected to the customer's phone line. The computer is continuously checking the Systems to insure that they are running properly. It records data and information and, if there is a problem, it automatically alerts the main office that service is required. Just like many household appliances and devices, the System needs some, though minor, monthly maintenance.

Sometimes pine bedding needs to be added to the AlasCan Separation/Composting Tank and sludge needs to be pumped from the AlasCan Greywater Treatment System. Monthly, a certified technician approved by AlasCan of Minnesota, Inc. will inspect the Systems and provide the service to keep them operating at peak efficiency.

G. Conveyance System

All effluent conveyance components designed to move effluent from the AlasCan/ClearWater™ System to an absorption area shall comply with the requirements of the *Sewage Handling and Disposal Regulations*

II. Scope of the Experiment

This experimental approval is granted for residential homes generating wastewater flows of 1,000 GPD or less and the utilization of the AlasCan/ClearWater™ Model A or B. A maximum of 500 of each system may be installed under this experiment. The Division will release the permits in-groups of 100 based on the experimental data. The composting facilities of 24 of these systems will be monitored in accordance with section VII. System A and B will each have 24 of the greywater treatment systems tested. Testing will continue for a minimum of eighteen months on each of the 24 systems and will continue up to a maximum of 36 months. The sampling protocol is described in Section VII.

III. Disposal Area and Backup Requirements

System A requires a drainfield designed in accordance with SHDR or approved policy. Since the drainfield/dispersal system complies with the regulations or policy no backup is required. A reserve area may be required in accordance with the regulations or local ordinance.

Both Systems A and B use a composting toilet and greywater treatment system. The backup for the composting toilet is a composting toilet that complies with the requirements specified in the SHDR. The backup for the greywater treatment system will be another treatment system approved by the regulations or the Division.

System B is designed to have no discharge. It does require a drainfield area equivalent to System A as a backup in case the re-cycle portion of the experimental system fails.

IV. Design Criteria

The AlasCan/ClearWater™ treatment equipment can be installed in either an 8' W x 13' L x 7' H (or equivalent sized 10' W x 12' L x 7' H) buried vault, an above ground building, or a room in the basement (mechanical room) or garage.

V. Installation

1. Installers shall be trained by AlasCan of Minnesota, Inc., and certified as having passed their minimum training qualifications prior to installing any AlasCan/ClearWater ™ Systems in Virginia.

2. The manufacturer's recommendations shall be followed for the AlasCan/ClearWater ™ System startup.

3. All mechanical components, pumps, pump cycling, filters, and systems must be demonstrated to be fully operational in accordance with their design.

VI. Operation

All AlasCan/ClearWater™ System owners shall be provided with written and oral instruction on the proper operation and maintenance of the AlasCan/ClearWater™ System. At a minimum this will include a copy of the Installation and Operation Manuals prepared by AlasCan of Minnesota, Inc. Updates, revisions and other changes to this section are the responsibility of AlasCan of Minnesota, Inc. Copies of changes should be submitted to the Department on an informational basis. Nothing in this approval is intended to prevent or restrict the development of instructional materials for public use. No prior approval of such literature is required provided the literature contains no endorsements, approvals, or suggestions that the Department in any manner promotes the use of one system above any other.

VII. Testing and Evaluation Procedures

All sampling and the submission of all reports shall be done by, or under the supervision of, a professional engineer registered in Virginia.

Composting Facilities

All compost disposed of as indicated in section I.A.2. or 3. shall be sampled before disposal for fecal coliforms in accordance with Table 3 of 12 VAC 5-585. Five percent or a minimum of one per year shall be sampled in accordance with Table 8 of 12 VAC 5-585.

Greywater Systems

Effluent samples for System A shall be collected before discharge to the absorption area. Effluent samples for System B shall be collected at a point of use or at a special tap designated for this purpose. Each AlasCan/ClearWater™ System selected by the Division and AlasCan of Minnesota, Inc. for sampling shall have two sampling ports installed for the purpose of sampling the before and after effluent treatment.

The sampling ports must be designed to preclude the entrance of untreated effluent. Tests will be conducted on effluent before reuse or discharge to the absorption area for fecal coliform bacteria, pH, and chlorides on a monthly basis for System A and semiannually for System B. Quarterly tests will be conducted on the

AlasCan/ClearWater™ Systems A and B for CBOD5 and TSS. Tests for NO3-N may be conducted to demonstrate nitrate removal efficiency if desired.

In the event that interim test results preclude the possibility of the product passing the experimental protocol, the Department may notify AlasCan of Minnesota, Inc. by certified mail that additional testing is not warranted and that the experiment is over.

Standards for the Greywater Systems

Fecal Coliform: The geometric mean of samples collected from the final sampling port for System A shall average less than 10 cfu/100mls and no single sample shall exceed 200 cfu/100mls. Fecal coliform test shall be done by MPN or Membrane filter. Samples collected for System B shall have no coliform detected. Samples may be analysed as a drinking water for the presence of coliform bacteria.

N03: No performance standard is established; however, results may be used to demonstrate nitrate-nitrogen reduction and used where this is necessary.

Chlorides: No performance standard is established.

TSS & BOD_5: 10 mg/L for BOD_5 and TSS. Since the required treatment is based on the proposed soil dispersal system the 10 mg/L value shall be used. If the system fails to meet this criteria but complies with secondary treatment standards (30 mg/L) then only those system which were required to have 10/10 treatment would need to be replaced or have additional treatment added to bring the systems into compliance with the regulations or policy.

VIII. Operation and Monitoring

For the first three years of use after this experimental protocol is granted, AlasCan of Minnesota, Inc. shall maintain a database of all AlasCan/ClearWater™ Systems installed. Said log shall include the following minimum information: System location (by tax map or owner's name, address and county), and all associated physical, biological and chemical data if the AlasCan/ClearWater™ System is being monitored. Said log shall be reported to VDH on a quarterly basis and shall be provided by the 15th of the month following the end of the quarter. The log shall be available to VDH within 5 business days upon request.

IX. Responsibilities and Permitting Procedures

This approval has been granted specifically for the process described in the application made by AlasCan of Minnesota, Inc. for the AlasCan/ClearWater™ Systems. Any changes to the components used in this process must be reviewed and approved by VDH

on a case-by-case basis prior to use. All requests shall be made in writing. AlasCan of Minnesota shall be responsible for making all copies of changes for dissemination by the Division.

No contractor may install an AlasCan/ClearWater™ System unless AlasCan of Minnesota, Inc. first certifies him or her as meeting their minimum competency standards for contractors.

The AlasCan/ClearWater™ Systems are experimental systems and the proposal was submitted under the supervision of a licensed professional engineer. Therefore, formal plans for each individual installation are not required. However, plans must be provided for each submittal indicating the location and installation requirements. The local health department may deny a construction permit if they determine that the submittal is not adequate for installation. In case of a disagreement between the local health department and AlasCan of Minnesota, Inc. the Division shall make the final decision.

Permitting shall be done by the local health department based on their satisfactory site evaluation and review of plans and specifications prepared in accordance with the manufacturer's specifications and all applicable state regulations and policies and any relevant local ordinances.

Construction permits shall be valid for a period of 18 months. The Virginia Department of Health shall establish the completion date of the experiment by determining when sampling on the 24 AlasCan/ClearWater™ Systems being monitored under this protocol will be completed. Upon successful completion of the experimental protocol, the Department will convert unused construction permits to conventional construction permits and extend the life of the permit to 18 months from the date of issuance or to an approval letter. Such conversion shall be done at no cost to the permit holder. In the event that the AlasCan/ClearWater™ Systems fail the experimental protocol, unused permits will become null and void. Permits shall note the experimental nature of the AlasCan/ClearWater™ System and that they cannot be converted to an approval letter. All permits shall be recorded in the accordance with 12 VAC 5-610-250 J.6.

AlasCan of Minnesota, Inc. shall be responsible for providing up to six training classes (up to 50 students each) during the first 6 months after this approval is granted and at least one training class annually thereafter. The training shall include a manual covering proper siting, sizing, construction, installation, and inspection processes for the AlasCan/ClearWater™ System. All training materials, the course syllabus and training locations shall be reviewed and approved by the Division prior to actual training.

Should the AlasCan/ClearWater™ Systems fail to perform to the satisfaction of the Department, the Department may rescind or modify this experimental protocol. Prior to taking such action the Department shall notify AlasCan of Minnesota, Inc. of the nature of the problem and of the action the Department intends to take.

If any AlasCan Separation/Composting System fails to perform as warranted by AlasCan of Minnesota, Inc. it shall be removed and an NSF approved similar composting system shall be installed. If any AlasCan Greywater Treatment System fails to perform as warranted by AlasCan of Minnesota, Inc. it shall be removed and an NSF approved similar greywater treatment system shall be installed.

END